

New Hampshire's Independent Energy Study Synthesis

Chapter 8 – Smart-Grid Deployment Review and Assessment

November 30, 2012

Summary of Chapter 8

Chapter 8 of the New Hampshire Independent Energy Study provides a broad overview of smart-grid technology, how it might be applied in New Hampshire, the status of smart-grid deployment in New Hampshire, and recommendations for policies and programs that will help New Hampshire benefit from smart-grid investment. The chapter contains 15 recommendations and sub-recommendations. In its most simple terms, from a customer standpoint, a smart grid could enable customers to better understand, monitor and control their own electricity usage, to take into account usage levels, timing and pricing. However, the recommendations presented in this chapter are based on the premise that smart-grid technology is mature enough to be widely deployed in the state. Despite the fact that there have been dozens of dynamic pricing pilots implemented throughout the country, the protocols, standards and technology are still in the development stage.

Findings

Implementation of many of the Study's related recommendations is premature at this time, but certain actions to move NH forward should be considered in both the near and long term. Several of the recommendations can be, and are being, implemented by the utilities without smart-grid deployment, or, in the case of outreach and education, need to be implemented in advance of deployment.

When and how smart-grid technology will be widely deployed in New Hampshire will be highly influenced by state energy policy. The focus of such a policy should be on long term performance while allowing flexibility and innovation to respond to this changing market. Such flexibility will be important to realize success relative to smart-grid deployment.

Top Priorities for Early Action

There is no the need for legislative action relative to smart grid at this time. However, there are a few key elements that should be addressed by others near term to ensure greater success with deployment in the future.

Continue Participation by the State of NH in the ISO-NE Demand-Response Program and Expand If Possible

The state demand-response participation has been successful and is generating cost savings for the State of NH¹. State participation in the ISO-NE Demand-response program and

1 The Demand-response program is a voluntary program for facilities to enroll in that earns the state money for state building projects. The program pays money to the State for facilities to be on stand-by with emergency generators in case of a power emergency. Facilities can also be on stand-by with a

other related efforts should continuously be reviewed for fiscal effectiveness as those programs are continuously changed, and participation expanded when and where feasible.

1) Implementation:

Department of Administrative Services

Early Education and Outreach of Decision Makers and Stakeholders

While not a specific recommendation of the Independent Energy Study, one priority should be to develop education and outreach to inform policy makers and the public. There is not a widespread understanding about smart-grid technology, its purpose and its potential to help the state achieve energy efficiency goals. Education of policy makers now will help ensure well-informed policy decisions in the future regarding this technology. Consumer education and outreach efforts as smart-grid technology is ready to be deployed will help pave the way for future acceptance of what is currently a relatively misunderstood, and by some feared, technology.

For instance, there have been concerns that this technology could be used in a manner that has implications for customer autonomy² and privacy. More specifically, critics of smart-grid deployment have suggested that utilities could use this technology as an “involuntary load control device” and shut off appliances and equipment without customers consent during times of peak demand as well as to disconnect service for non-payment. In addition, there are concerns that the technology could be used to monitor how energy is used by customers.

As part of a broader education and outreach effort associated with smart-grid deployment, it will be essential to provide consumers with clear information regarding the data that is, and is not, gathered by the utilities, how that data is used, and what consumer protections are in place.

1) Development:

Education & Outreach Working Group of the Energy Efficiency & Sustainable Energy Board

2) Implementation:

NH Utilities & Key Stakeholders and Interest Groups

Priorities for Medium or Long-Term Action

Provide Meaningful Feedback to Engage Consumers in Energy-Use Reduction

Energy-use data in and of itself will not motivate consumers to reduce their energy use. Such data must be provided within a context that allows them to judge whether their

curtailment plan, which means they agree to turn off unnecessary equipment in the event of a power emergency. Payments are deposited into a non-lapsing fund to be used for agency energy efficiency projects and program expenses.

² Autonomy, in this sense, refers to a customers ability to consume electricity as they see fit.

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individual usage is above or below the norm, and also provide them with ways in which to reduce their use and reasons why they should consider doing so.

1) Development:

NH Utilities in consultation with Energy Efficiency & Sustainable Energy Board Education & Outreach Working Group

2) Implementation:

NH Utilities

Leverage Smart Grid to Reduce Peak Consumption (1):

- ***Offer Demand Response to All Rate Payers; and***
- ***Offer Automated Demand Response***

Demand-response technology and deployment will likely evolve a great deal over the next decade, but not all demand response requires smart-grid technology be in place. Each utility will need to analyze the cost-benefits of the level and timing of demand-response deployment as the technology evolves. An over-arching state energy policy will influence that analysis, as well as the timing of subsequent deployment efforts. In the near term demand response can and is offered to large customers.

1) Implementation:

NH Utilities

Leverage Smart Grid to Reduce Peak Consumption (2)

- ***Offer Dynamic Pricing as Market-Based Demand Response; and***
- ***Educate Customers About Dynamic Pricing***

As noted in the Independent Energy Study, there are multiple levels of dynamic pricing. Real-time pricing would be difficult to administer on a wide-spread basis and even more difficult for the average ratepayer to understand without significant education and outreach efforts. Therefore, this action is likely a long term prospect. However, time-of-use (TOU) pricing can be deployed without AMI/smart grid. “Dumb meters” have been used for TOU rates for decades. What smart meters and associated communication technologies provide is the ability to provide more granular usage information closer to real-time and at lower cost than previously to the ratepayer.

1) Implementation:

NH Utilities

Consider the Larger System During Evaluation, Not Each Project in Isolation

The study's recommendation to "consider the larger system" is simply *Good Utility Practice* and therefore, each utility would likely argue that is already happening.

1) Implementation:

NH Utilities

Protect Sensitive Information

- ***Ensure Customers are Aware of Data about Them; and***
- ***Protect Ratepayers' Control of Data about Them***

Standards for smart-grid data security have been developed by the National Institute of Standards and Technology and are also under review by the North American Electric Reliability Corporation. California has established rules to protect information about consumer use of smart meter electrical services. In addition, the Electronic Privacy Information Center has made some specific recommendations on this issue. New Hampshire will need to evaluate the standards established by NIST and NERC as well as those established by other states or recommended by consumer groups to ensure adequate protection. Basic customer information is already protected by state law.

1) Development:

NH Utilities & Public Utilities Commission

2) Implementation:

NH Utilities

Background

The smart grid is a system of digital two-way communication between electric utilities, generators, meters, and other connected devices. The physical infrastructure enables programs and policies that provide more timely information on energy use and grid conditions. This information can then be used to improve grid performance and services. Smart-grid infrastructure combined with appropriate programs and policy can:

- Reduce energy consumption,
- Reduce peak demand,
- Increase the system load factor, which reduces the fixed cost per unit energy,
- Better integrate variable renewable energy sources,
- Reduce emissions,
- Improve utility outage management,
- Reduce meter-reading costs, and
- Provide information on all fuels and even water use.

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Smart-grid technology includes addition of computerized data collection and two-way communications on all aspects of the electric utility grid, including generating facilities, wires, substations, switches, transformers, and metering within an individual account.

The NH Electric Cooperative is in the process of deploying an Advance Meter Infrastructure (AMI) system to its 80,000 members and the required related communications infrastructure to enable it. NHEC's AMI infrastructure and its Meter Data Management system will, once fully implemented, provide meaningful feedback to its members that will enable them to compare their own usage before and after making a behavioral or equipment change. There are also alternative customer feedback programs that do not require smart-grid technology.

In its 2012 Core Program Filing, PSNH proposed a customer engagement pilot program. The parties are currently engaged in finalizing the program details for a pilot slated to commence in September.

In 2008, Unitil Energy Systems completed deployment of its AMI system that provides fully automated meter reading and 2-way communications over power lines. In 2011 Unitil completed a Time-of-Use (TOU)/ Critical Peak (CP) pilot program which tested the response of residential consumers with central AC to TOU/CP pricing, TOU/CP pricing with in-home technology and Controllable thermostats, and the response of a small set of non-residential customers to CP pricing only. The evaluation reports on the pilot program have been filed with the Commission.

PSNH also conducted a demand-response pilot program called Peak Smart. The funding for the program came through ISO-NE. With the introduction of the Forward Capacity Market (FCM), the funding for the pilot was discontinued and the program ended. The FCM is not really set up to handle a program such as demand response because utilities bid into the FCM 3 years in advance. Therefore, programs like this are best handled by companies such as EnerNOC, who work with utilities and companies to design voluntary energy curtailment plans to reduce non-essential energy use during critical periods of imbalance between electricity supply and demand on the grid. Under such plans, commercial, industrial, and institutional entities get paid year-round just for being on call and paid an additional amount when they reduce demand during critical periods.

The PUC will have an integral role to play in further development of demand-response programs that encourage innovation, but still provide reasonable returns to ratepayers.